



Attorney Docket No. 9319

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#14  
7-16-03

In re	)	
Application of	)	Examiner: TU M. NGUYEN
PATRICK C. MARKS ET AL.	)	Art Unit: 3748
Serial No.: 10/051,003	)	Docket No: 9319
Filed: JANUARY 18, 2002	)	
For: <b>MULTIPLE FREQUENCY</b>	)	
<b>HELMHOLTZ RESONATOR</b>	)	

APPEAL BRIEF

Syracuse, New York

June 26, 2003

Commissioner for Patents  
Alexandria, Virginia 22313

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JUL 16 2003  
TECHNOLOGY CENTER R3700

Sir:

This is an Appeal from the Examiner of Group Art Unit 3748 refusing claims 3, 7 and 9.

REAL PARTY IN INTEREST

The real party in interest is Carrier Corporation and the assignment thereto is recorded in the United States Patent and Trademark Office at Reel 012651, starting at Frame 0897.

RELATED APPEALS AND INTERFERENCES

07/16/2003 DPOLLARD 00000007 030835 10051003  
02 FC:1402 320.00 DA  
There are no other appeals or interferences known to Applicants' legal representative or assignee which will directly offset or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

**STATUS OF THE CLAIMS**

Claims 3, 7 and 9 stand finally rejected. Claims 4, 8, and 10-12 stand objected to as being dependent upon a rejected base claim.

**STATUS OF THE AMENDMENTS**

No Amendment was filed after the Final Rejection.

**SUMMARY OF THE INVENTION**

The present invention is directed to a multiple frequency response Helmholtz resonator (50; 150; 250) for use with a multi-speed engine (20) system (100) to achieve noise attenuation at different engine operating speeds. For a Helmholtz resonator to function it must be acoustically coupled to the noise source. The frequency response is changed by: (1) changing the cross section of the restricted path(s) connecting the resonator to the noise source; (2) changing the length of the restricted path(s); and/or (3) changing the volume of the chamber of the Helmholtz resonator. In the Background of the Invention the noise problem associated with a plurality of parked refrigeration units is discussed. As stated at page 1, lines 22-24, "(i)n a Helmholtz resonator you have a chamber/volume (50-A, 50-B; 150-A; 250-A, 250-B) configured as a dead end side branch to a duct and connected to the duct by a passage/neck (50-1; 150-1, 150-2, 150-3; 250-1, 250-2, 250-3) that is substantially smaller in cross section."

Passages/necks 50-1, 150-1 and 250-1 continuously connect the Helmholtz resonators to the inlet line whereas passages/necks 150-2, 150-3, 250-2 and 250-3 selectively connect the Helmholtz resonators to the inlet line under the control of valve 152 (Figures 4-6) or valve 262 (Figure 7 and 8).

The present invention modifies the volume and/or the neck area of a single Helmholtz resonator to change the frequency range to which the resonator is responsive. The frequency response of the Helmholtz resonator is changed responsive to changes in the speed of the engine. The changes in volume and neck area are achieved through valves (52; 152; 252, 262). The use of the term "valve" in the Specification is explained at

page 4, lines 16-19 and is based on the structural similarities although there is no net flow into or out of the closed chamber defining the Helmholtz resonator.

### **ISSUES**

The issue with respect to claims 3, 7 and 9 which stand finally rejected under 35 U.S.C. § 102(e) is whether they are unpatentable over Jessberger.

### **GROUPING OF THE CLAIMS**

Claims 3, 7 and 9 do not stand or fall together. Claims 3, 7 and 9 are each independent and have different degrees of specificity in their limitations.

a) PRIOR ART RELIED ON:

JESSBERGER	6,494,290	12-2002
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Jessberger (U.S. Patent 6,494,290) discloses a plurality of embodiments. In the embodiment of Figure 1, the device can be assembled with tubes of length 3a or 3b - thus the frequency response is not variable without reassembly. In the embodiment of Figures 2 and 3, flow paths having cross sectional areas of zero, A1, A2, and A1 plus A2 are disclosed but there is no change in chamber volume nor is there continuous communication through a single restricted connection. In the embodiment of Figure 4, wall 15 is movable to vary the volume of the resonator. The Examiner has specifically relied on the embodiment of Figures 2 and 3 which is specifically described at column 3 lines 8-24. Specific attention is directed to column 3 lines 12-14 where it states that "a pivotable flap 10 is mounted with which the openings 5 and 6 can be alternately closed and opened, or both can be opened or closed" (emphasis supplied). No embodiment discloses plural restricted paths with one path always open or plural paths in combination with a variable volume.

b) CENTRAL ISSUE:

Whether or not the reference discloses a Helmholtz resonator which is continuously operatively connected to the inlet line via a restricted connection.

c) REBUTTAL OF REJECTION:

Claims 3, 7 and 9 stand finally rejected under 35 U.S.C. § 102(e) as anticipated by Jessberger (U.S. Patent 6,494,290). Independent claims 3, 7 and 9 each require "a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection." If the Helmholtz resonator is not acoustically coupled to the inlet line, as by the closing of a valve, it is not "operatively connected" but, rather, it is disconnected. Accordingly, it is believed that the quoted limitation requires a restricted connection that always permits the Helmholtz resonator to function as a Helmholtz resonator without interruption, i.e. there is no valving of the restricted connection. In reading the reference against the foregoing claim limitation the Examiner has read connection 7 of Figures 2 and 3 as the restricted connection by which the Helmholtz resonator is continuously operatively connected to the inlet line. In support of his interpretation, the Examiner states that "(t)he phrase 'continuous' is defined as 'marked by uninterrupted extension in space, time, or sequence'. Thus, in a view point of time (emphasis added), as shown in Figure 2, the closed chamber (9) in Jessberger defines a Helmholtz resonator which is continuously operatively connected to the inlet line (1) via a restricted connection (7) to reduce noise in the engine at all times (or for an uninterrupted extension of time), regardless if the connection (7) is opened or closed" (my emphasis). It follows that it is the Examiner's position that a Helmholtz resonator is operative whether or not it is configured (acoustically coupled) so as to be able to function as a Helmholtz resonator.

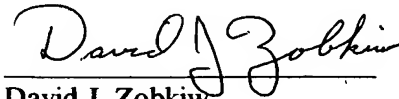
Claims 3 and 7 were dependent claims written in independent form such that the ultimate subparagraph is a further defining of the structure of the penultimate subparagraph. The ultimate subparagraph recites "said means for changing the

frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line." It is believed that this is a positive recitation of a second restricted connection which is selectively connected which corresponds to being operative or inoperative in changing the frequency response relative to the first restricted connection. The Examiner read the reference on the last subparagraph as follows: "wherein the means for changing the frequency response includes at least one restricted connection (7) which is selectively connected between the chamber and the inlet line (connection (7) is selectively opened or closed (lines 8-15 of column 3))." It is noted that the Examiner has again read connection 7 as the recited structure whereas it is believed that two restricted connections have been recited. Additionally, the Examiner has read connection 7 as both "continuously operatively connected" and as "selectively connected" it is believed that these terms must be mutually exclusive when considered together and read on the same structure in the same claim. Even if the Examiner intended to read connection 8 on the claim rather than connection 7, it would not make a difference in that the combination of configurations for connectors 7 and 8 are the same and the same mutually exclusive limitations would apply in reading the reference on the claims.

In claim 9 the last subparagraph requires "means for changing the frequency includes a valve having only an open and a closed position." It is believed that this limitation requires that the valve have no more than two positions with one being open and one being closed. The Examiner has read valve 10 of the reference on the limitation with no further explanation. As noted above, at column 3, lines 12-14, valve 10 is described as having four positions but the claim requires that there only be two positions. Further, the valve 10 coacts with each connection thereby precluding that one connector is always open/operative.

In summary it is believed that finally the reference fails to disclose plural restricted connections with the volume with one connection always being open. The reference further fails to disclose the combination of plural restricted connections and a variable volume.

Respectfully submitted,  
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**APPENDIX**

3. In a system having a multi-speed engine with an air inlet line connected to said engine, a Helmholtz resonator structure comprising:

a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a <sup>first</sup> restricted connection;

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine;

said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line.

7. A refrigeration system having a multi-speed engine with an inlet line connected to said engine, microprocessor means for controlling the speed of said engine, the improvement comprising:

a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection;

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine;

said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line.

9. A refrigeration system having a multi-speed engine with an inlet line connected to said engine, microprocessor means for controlling the speed of said engine, the improvement comprising:

a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection;

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine; and

said means for changing the frequency includes a valve having only an open and a closed position.